

REFERENCES

- Krombein, Karl V.** 1964. Natural History of Plummers Island, Maryland. XVIII. The Hibiscus wasp, an abundant rarity, and its associates (Hymenoptera: Sphecidae). Proc. Biol. Soc. Wash. 77: 73-112.
- Robinson, H.** 1964. A synopsis of the Dolichopodidae (Diptera) of the Southeastern United States and adjacent regions. Misc. Publ. Ent. Soc. Amer. 4: 103-192.

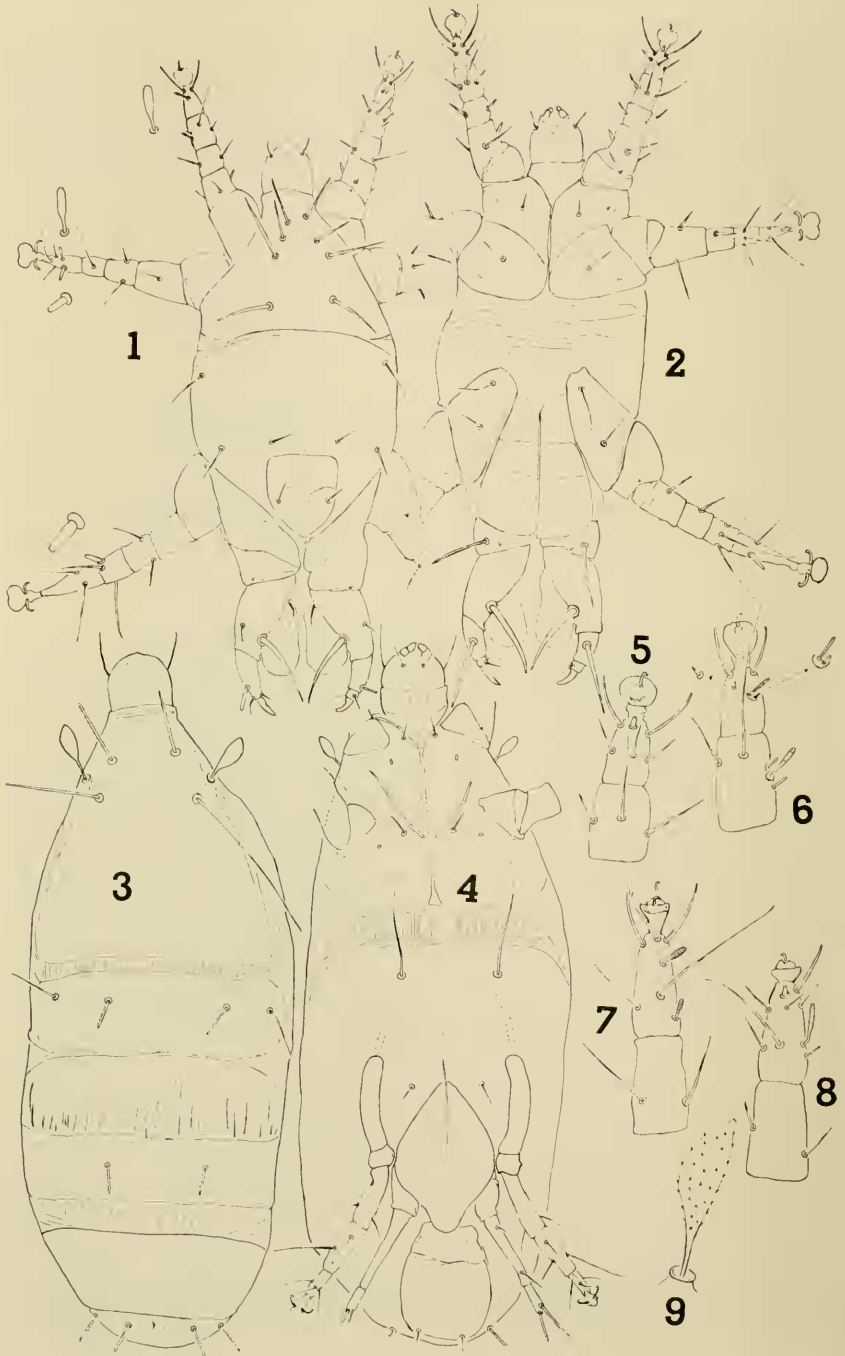
FURTHER STUDIES ON THE TARSONEMIDAE
(ACARINA)

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In a continuation of studies on the Tarsonemidae (Smiley, 1964), a family of mites of importance to agriculture, I here describe one species belonging to the genus *Hemitarsonemus* Ewing, two species to the genus *Stenotarsonemus* Beer, and two species to the genus *Tarsonemus* Canestrini as new from material in the U. S. National Museum collection. All are from the Western Hemisphere. Also included in this study are five new species of tarsonemids collected from various areas in the South Pacific and submitted for determination by D. M. C. Manson of the Horticultural Research Centre, Department of Agriculture, Levin, New Zealand. This collection is represented by the following genera: *Hemitarsonemus* Ewing (one species), *Tarsonemella* Hirst, and *Tarsonemus* Canestrini (four species). The genus *Neotarsonemus* is here erected to include the two species, *Hemitarsonemus latus* (Banks) and *H. beeri* Smiley in which legs IV of the males possess terminal claws which are reduced to a ball-like process. The genus *Fungitarsonemus* Cromroy (1958) is here synonymized with the genus *Hemitarsonemus*. Ewing (1939) and Beer (1954) give an excellent historical account of the confusion and errors made previously in the genus *Hemitarsonemus* and perpetuated by former acarologists. It is hoped that this present generic arrangement will alleviate past and future errors.

A key is presented for the males of species belonging to *Hemitarsonemus*. *Tarsonemella* is reviewed, and additional morphological characters are supplied for the genus as well as for *T. beameri* Beer.



***Steneotarsonemus spinki*, n. sp.**
(Figs. 1-9)

The male of this species is characterized by the presence of a pair of dagger-shaped setae on femur and genu IV, and a short, stout, blunt spurlike seta on tibia III.

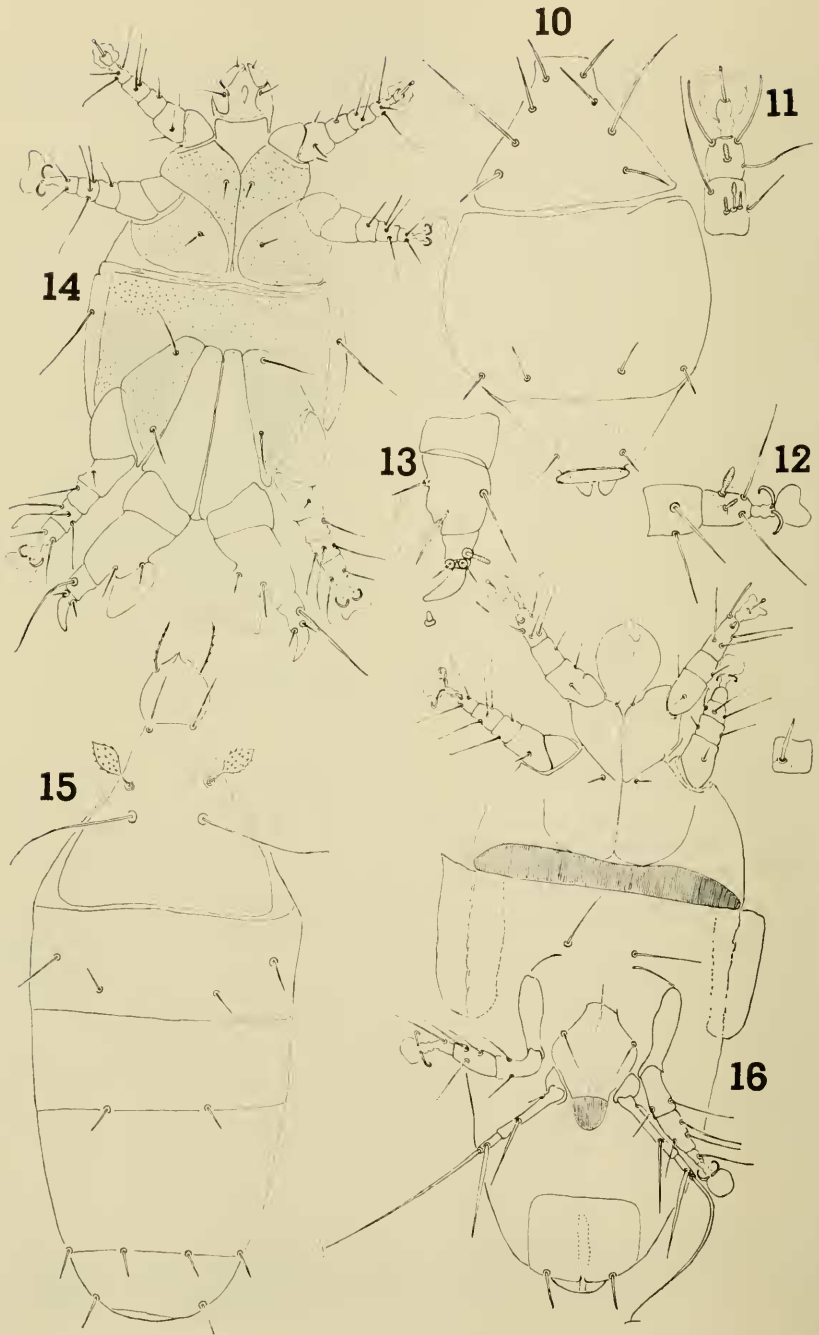
Male. Body elongate and broadest in anterior region of hysterosoma. Dorsal propodosomal setae simple, short, stout, slightly dagger-shaped; third pair of propodosomals longest, one-third longer than first pair; second pair shortest; fourth pair slightly longer than first pair. Hysterosoma with three rows of simple setae; first row with single pair of lateral setae; second row with two pairs of setae; third row with single pair of setae; setae of first row longest, setae of other rows more or less equal in length. Ventral propodosomal and hysterosomal setae subequal in length; coxae I with single pair of setae, slightly shorter than single pair on coxae II; coxae III with two pairs of setae subequal in length, and slightly longer than setae of coxae I and II; coxae IV with pair of dagger-shape setae. Ventral apodemes as figured. Legs I and II similar in size and length; genu I with a rodlike solenidion similar to solenidion on tibia II but without spurlike seta; legs III longest, with spurlike seta stouter and longer than spurlike setae of legs I and II; leg IV as figured. Femur with large inner median lateral flange; inner anterior and outer median setae short and of equal length; posterior inner seta about as long as segment, strong, dagger-shaped; genu with daggerlike ventral seta similar to that on femur, and with distal rodlike solenidion; tibia-tarsus short, with two tiny inner setae and stout ventrally curved claw. Body 217 μ long by 121 μ wide.

The female associated with the above male is similar in having a long rodlike solenidion dorsally on tarsus I and a bifurcate spurlike seta on the distal ventral surface.

Female. Body elongate, broadest in region of hysterosoma. Propodosomal shield trapezoidal, bearing two pairs of setae; first pair slightly serrate, about one-third as long as second pair, second pair about two thirds as long as shield; pseudostigmatic organs ovoid, bearing small spurlike projections, pedicel as long as expanded distal portion. Dorsum of hysterosoma with five distinct transverse segments; first segment with two pairs of setae, outer pair simple and longer than the inner serrate pair; second segment without setae; third segment without simple setae but with two inner serrate setae subequal to the pair of the first segment; fourth segment without setae; fifth segment with two pairs of serrate setae. First pair of ventral apodemes Y-shaped, converging with the anterior median apodeme; a pair of simple setae adjacent to the first pair of apodemes; apodemes II longer and stronger, with a pair of simple setae which are shorter than the anterior pair; posterior median apodeme not converging with apodeme III and transverse apodeme; apodeme III obscure, and above these, a pair of long simple setae; apodeme

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Steneotarsonemus spinki, new species. Fig. 1, dorsum, male; fig. 2, venter, male; fig. 3, dorsum, female; fig. 4, venter, female; fig. 5, ventral, tibia and tarsus I, male; fig. 6, dorsal, tibia and tarsus I, male; fig. 7, dorsal, tibia and tarsus I, female; fig. 8, ventral, tarsus and tibia II, female; fig. 9, pseudostigmatic organ, female.



IV converging with genital plate, and with a pair of simple setae subequal in length to the pair on apodeme II. Legs robust, as figured. Body 274 μ long by 108 μ wide.

The male holotype, USNM 3148, and a female paratype were collected on *Sogata orizicola* Muir, a planthopper, Baton Rouge, La., November 18, 1960, by W. T. Spink, for whom this species is named.

***Steneotarsonemus friedmani*, n. sp.**

(Figs. 10-16)

The large empodium on legs I-III and the ventral body striations will separate this species from other known members of the genus.

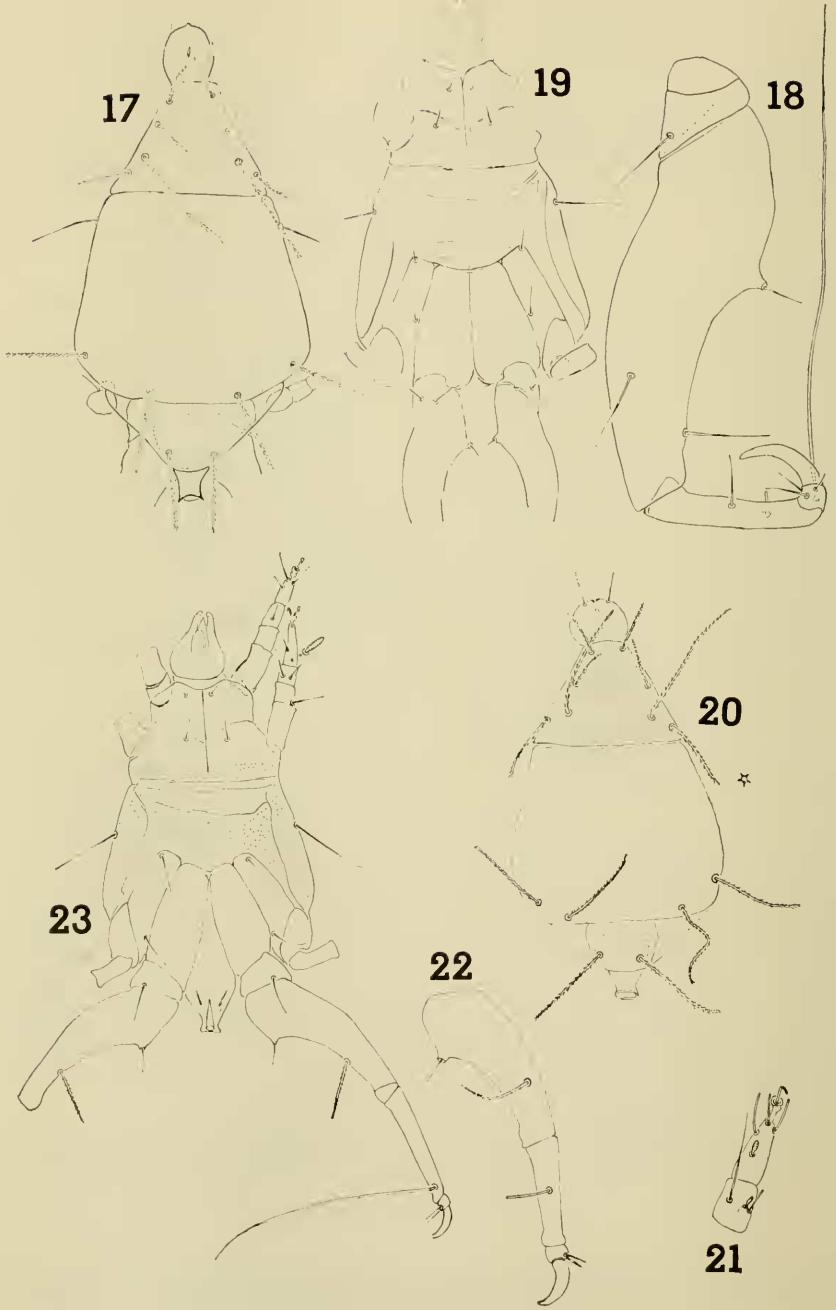
Male. Body elongate oval, broadest in anterior region of hysterosoma. Propodosomal shield trapezoidal; with four pairs of simple setae, first pair shortest; second pair two-thirds length of third pair, slightly blunt apically; third pair longest; fourth pair subequal to second pair, saberlike and pointed distally. Hysterosoma with two pairs of simple setae subequal in length located in the region of metapodosoma, about one-half length of fourth pair of propodosomals; posteriorly with a single pair of simple setae subequal to anterior pair. Ventral propodosomal setae and apodemes as figured; apodeme I converging with anterior median apodeme; apodeme II not converging with anterior median nor transverse apodeme; apodeme I, the inner coxal condyles, anterior median, and apodemes II forming heart-shaped figure; striation for the heart-shaped figure as figured. Venter of hysterosoma as figured; the striae dotlike and stronger in anterior region, with some longitudinal striation, becoming smaller and dense below this region and on coxae III. Legs robust as figured. Body 223 μ long by 114 μ wide.

Female. Body elongate, broadest at propodosomal and hysterosomal suture. Propodosomal shield trapezoidal, bearing two pairs of simple setae; first pair one-half length of second pair; second pair about two-thirds as long as shield; pseudostigmatic organs ovoid, bearing small spurlike projections; pedicel as long as expanded distal portion. Dorsal capitulum about as long as broad, with a pair of serrated setae. Dorsum of hysterosoma with four segments; first segment with two pairs of simple setae, outer pair one-fourth longer than inner median pair; second segment with a pair of inner median setae subequal to pair on the first segment; third segment with two pairs of simple setae (a lateral and median) subequal in length to those of segments I and II; fourth segment with only a pair of lateral simple setae subequal in length and size to those of segments II and III. Ventral surface as figured. Legs I-III strong and robust; with large empodia and claws; leg IV extending to margin of the body and terminating in a whiplike seta two times the length of the leg. Body 300 μ long by 121 μ wide.

The male holotype, USNM 3167, four paratype males and seven females were collected in leaf sheath of unidentified grass, Van Cort-

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Steneotarsonemus friedmani, new species. Fig. 10, dorsum, male; fig. 11, dorsal, tarsus and tibia I, male; fig. 12, dorsal, tarsus and tibia II, male; fig. 13, leg IV, male; fig. 14, venter, male; fig. 15, dorsum, female; fig. 16, venter, female.



landt Park, Bronx, New York, May 5, 1965, by W. Friedman, for whom this species is named.

Hemitarsonemus leonardi, n. sp.

(Figs. 17-19)

Three distinctive characters readily separate this species from other known members of this genus. These are: the dorsal serrate setae, the long stout claw of leg IV, and the slightly sclerotized lateral plates on the venter of the hysterosoma. Only the male is known.

Male. Body slightly elongate, broadest in region of the metapodosoma. Propodosoma trapezoidal and bearing near lateral margins four pairs of serrate setae; first and fourth pair subequal in length, second pair slightly shorter than first and fourth pair, fourth pair subequal to first pair. Hysterosoma with two pairs of equal serrate setae, stouter and subequal in length to first pair of propodosomals; and with a pair of lateral simple setae subequal in length to the two pairs of serrate setae. Opisthosoma with a pair of serrate setae equal in length to the two hysterosomal pairs. First and second pairs of ventral propodosomals equal in length. Ventral apodemes of propodosoma and hysterosoma as figured. Venter of hysterosoma with three pairs of simple setae, equal in length to the two pairs of ventral propodosomal setae; and with a slightly sclerotized plate on each side, beginning slightly posterior to the propodosomal and hysterosomal suture and extending almost to coxae III; lateral plate with a simple seta two-thirds longer than the ventral propodosomal and hysterosomal setae. Legs I and II similar in length. Leg III subequal in size and length to legs I and II. Leg IV as figured; femur with small inner median lateral protuberance bearing a simple seta and with two simple setae subequal in length below protuberance; tibia long and slender, with a short seta; tarsus short, with two simple setae and one whiplike seta longer than the leg, and with long strong, stout, curved claw. Body 185 μ long by 95 μ wide.

Female. Not known.

The male holotype, USNM 3147, was collected on *Citrus sinensis* (L.), Jamaica, March 9, 1961, by J. B. Bache-Wiig. The species is named for Dr. M. D. Leonard, of Washington, D. C.

Hemitarsonemus deleoni, n. sp.

(Figs. 20-23)

The male of this species keys out to *Hemitarsonemus peregrinus* Beer but it differs by having dorsal serrate setae.

Male. Body slightly elongate, broadest in region of metapodosoma. Propodosoma trapezoidal, slightly sclerotized and bearing near lateral margins four pairs

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Hemitarsonemus leonardi, new species. Fig. 17, dorsum, male; fig. 18, leg IV, male; fig. 19, venter, male. *Hemitarsonemus deleoni*, new species. Fig. 20, dorsum, male; fig. 21, dorsal, tarsus and tibia I, male; fig. 22, leg IV, male; fig. 23, venter, male.

of serrate setae; first and fourth pairs subequal in length; third pair longest, longer than propodosomal shield; fourth pair longer than first and second pairs but less than one-half length of third pair. Hysterosoma with two pairs of equal serrate setae, stouter and subequal in length to fourth pair of propodosomals; with a pair of lateral simple setae subequal in length to fourth pair of propodosomals. Opisthosoma with a pair of serrate setae equal in length to the two hysterosomal pairs. Apodemes I shorter than apodemes II; apodemes III and IV longer than anterior apodemes and as figured, with a lightly sclerotized lateral plate on each side, beginning slightly posterior to the propodosomal and hysterosomal suture and extending almost to coxae III; lateral plate with simple seta two-thirds longer than the ventral propodosomal and hysterosomal setae. Legs I and II similar in length, leg II with extremely large solenidium; legs III subequal in size and length to legs I and II. Leg IV as figured; femur with small inner, lateral protuberance bearing a simple seta, and a serrate seta; tibia with a long, slender sensory rod, about half the length of the tibia, tarsus about as long as broad and with large claw. Body 185 μ long by 95 μ wide.

Female. Not known.

The male holotype, USNM 3168, was collected on *Hibiscus* sp., Tonga Islands, June 15, 1965, by L. W. Burgess. This species is named for the late Dr. Donald DeLeon, who died the summer of 1966.

KEY TO THE MALES OF *Hemitarsonemus* EWING

1. Without a subapical spurlike process on the inner margin of femur IV 2
With a subapical spurlike process on the inner margin of femur IV
..... **tepidariorum** (Warburton)
2. Dorsal body setae serrated 3
Dorsal body setae simple 4
3. Tibia IV with a long, dorsal, tactile, rodlike seta **deleoni**, n. sp.
Tibia IV with a short, dorsal, tactile, rodlike seta **leonardi**, n. sp.
4. First and second pair of propodosomals not subequal in length 5
First and second pair of propodosomals subequal in length **cocosi** DeLeon
5. Second propodosomal seta not as long as the first pair of outer hysterosomal
setae 6
Second propodosomal setae about as long as the first pair of outer hystero-
somal setae **lodiei** DeLeon
6. First outer pair of dorsal hysterosomals subequal in length to the third pair of
propodosomals **boringuensis** (Cromroy)
First outer pair of dorsal hysterosomals twice the length of the third pair of
propodosomals **peregrinus** (Beer)

Genus *Tarsonemella* Hirst, 1923

This genus differs from the other genera in the family by the female possessing the following: Tibiotarsus I terminates in a stout strongly recurved claw which is recessed basally and truncated distally; tarsi II and III have empodia and an outer single lateral claw each; tarsi II, III, and IV each has a ventral spur distally; the venter of the hysterosoma has three pairs of apodemal setae and three pairs of subequal genital setae.

I have studied a slide with four females and six males, which I believe to be *Tarsonemella beameri* Beer. Neither Hirst nor Beer described a male, and the opportunity is here taken to point out generic and specific differences based on this sex. The generic characters for the male are as follows: Tarsi II and III have strong ventral spurs; the pretarsal elements are normal and have two claws. The venter of the propodosoma has three pairs of setae and the hysterosoma has five pairs of setae. The opisthosoma has two pairs of lateral setae on a transverse line, the posterior pair having migrated inward. Apodeme II has two pairs of simple setae.

Type species. *Tarsonemus (Tarsonemella) africanus* Hirst.

Type data. Female, collected from—"A hymenopterous insect (*Agaon xystrum* Waterston); from Koforidua, Gold Coast (April 4, 1921)."

***Tarsonemella beameri* Beer**

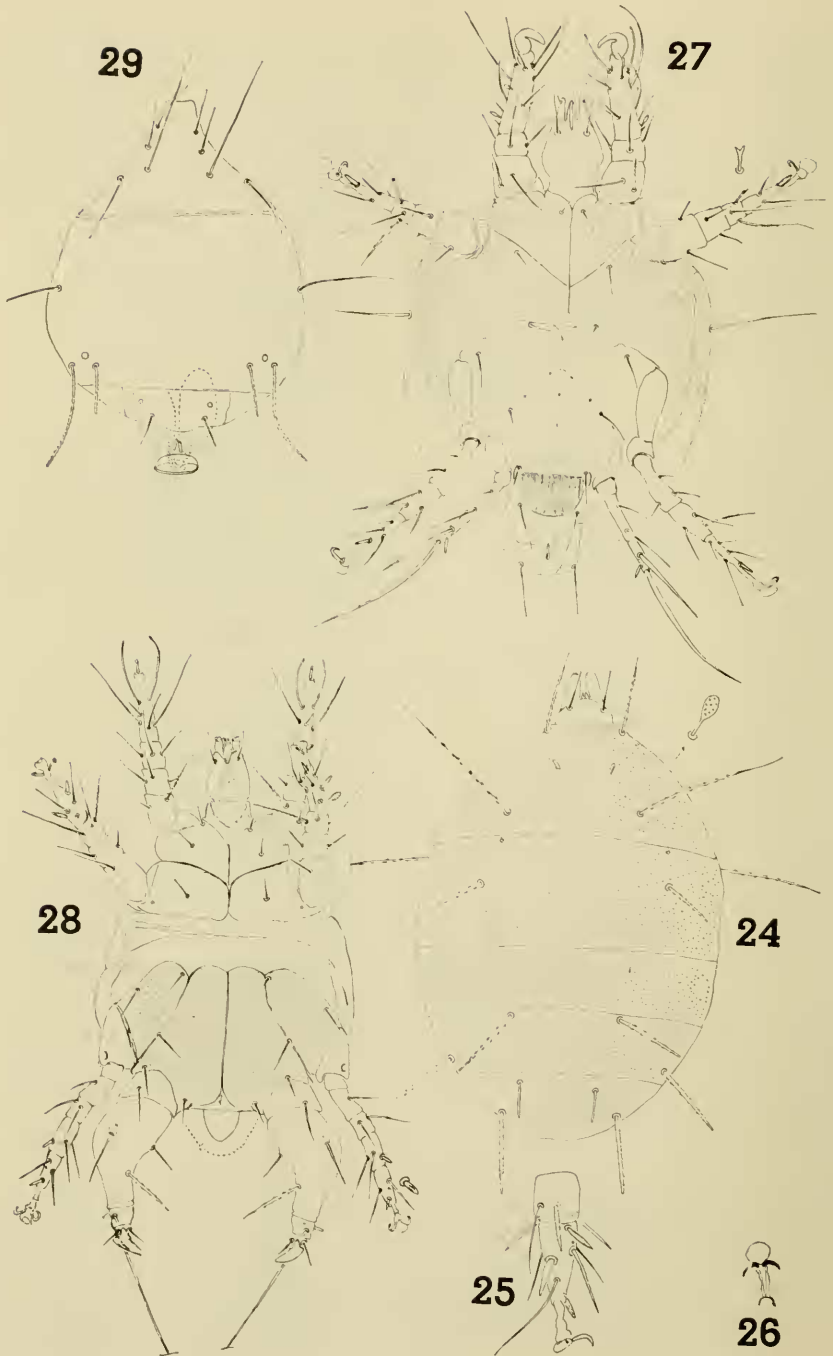
(Figs. 24-29)

Tarsonemella beameri Beer. 1958. Jour. Kan. Entomol. Soc. 31: (2) 188-192.

Female. The female is as illustrated and described by Beer except the following: The hysterosoma has six segments and is lightly sclerotized with two pairs of simple setae and six pairs of lobelike setae. The pseudostigmatic organs are mace-like. The ventral hysterosomal has three pairs of subequal genital setae and two pairs of subequal apodemal setae and a smaller pair below the suture adjacent to the transverse apodeme. The empodium of tarsi II and III has only a single outer lateral claw. Figure 25 represents my drawing of the tarsal claw on legs II and III, and figure 26 represents Beer's drawing of the tarsal claw for the same leg.

Male. Body elongate and broadest in region of the metapodosoma. Dorsal propodosomal setae simple, long, and slender; third pair of propodosomals longest, one-half again longer than others; first and second pair subequal in length; third pair slightly longer than first and second pair. Hysterosoma with a pair of simple lateral setae; two pairs of finely serrated setae postero-laterally, the outer pair longest, the inner pair about one-half the length of the outer pair; a pore located above this pair of setae; below these setae a pair of simple setae about one-half the length of the inner pair of finely serrated setae. Venter of gnathosoma and hysterosoma as figured; propodosoma with three pairs of setae; first pair shortest and adjacent to apodeme I; second pair, slightly longer than first pair, medially located on coxae II; coxae II with small lateral pore. Apodeme I forming Y-shaped juncture with anterior median apodeme; apodeme II curved, well defined, and converging with anterior median apodeme; apodeme III with two pairs of simple setae medially, and one pair anterior to apodeme IV; apodeme IV with three simple setae, one adjacent to apodeme III, another above the trochanter, these two being subequal in length; a shorter and smaller seta located posteriorly on coxae IV; posterior median apodeme well defined; coxae III and IV slightly sclerotized. Anal plate large and well defined, lying above the subcircular genital papilla. Legs I and II robust, as figured; legs III smallest, tarsi II and III with ventral spurs; legs IV as figured; femur with inner protuberance bearing a simple seta; below this seta a large finely serrated seta. Body 185 μ long by 121 μ wide.

Type data. Holotype and paratypes: Females, Saipan, Marianas Is-



lands, November 14, 1947, W. H. Lange, from the beetle, *Brontispa mariana*, on coconut palm, *Cocos nucifera* L.

Specimens examined. Three paratype females in the USNM Collection, and four females and six males collected by R. F. Winch in Chestnut, Cook Islands, April 10, 1964, which I believe to be the same species.

Neotarsonemus, n. gen.

(Figs. 30-31)

This genus is established to include two species previously assigned to *Hemitarsonemus* Ewing. These species are *H. latus* (Banks) and *H. beeri* Smiley. The two species may be separated as follows: In the males, the hysterosomal setae are long in *beeri* and short in *latus*. The females may be separated in that the transverse apodeme connects with the anterior median apodeme in *beeri*, whereas in *latus* these two apodemes do not connect.

The generic characters for the male are as follows: Tarsi II and III are without claws but with well defined bell-shaped empodia; tarsi I have claws. Leg IV is composed of five segments: the tarsus, tibia, femur, coxa, and the apodeme. The apodemal segment is defined by the fusion of the posterior median apodeme, apodeme IV, and what is here considered as the fifth apodeme, all connecting to the coxal segment. When these two segments merge with the posterior median apodeme, they form an archlike structure which is not present among males of the other genera. Femur IV has a spurlike process on the inner margin. Tarsus IV terminates with a knoblike claw. The propodosoma has four pairs of setae.

The characters for the females are as follows: Tarsus I has a recurved claw which is recessed basally and truncated distally. Tarsi II and III are without claws but have well defined bell-shaped empodia; there is a pair of setae between coxae IV.

Type species. *Hemitarsonemus beeri* Smiley, 1964.

Tarsonemus bucheleri, n. sp.

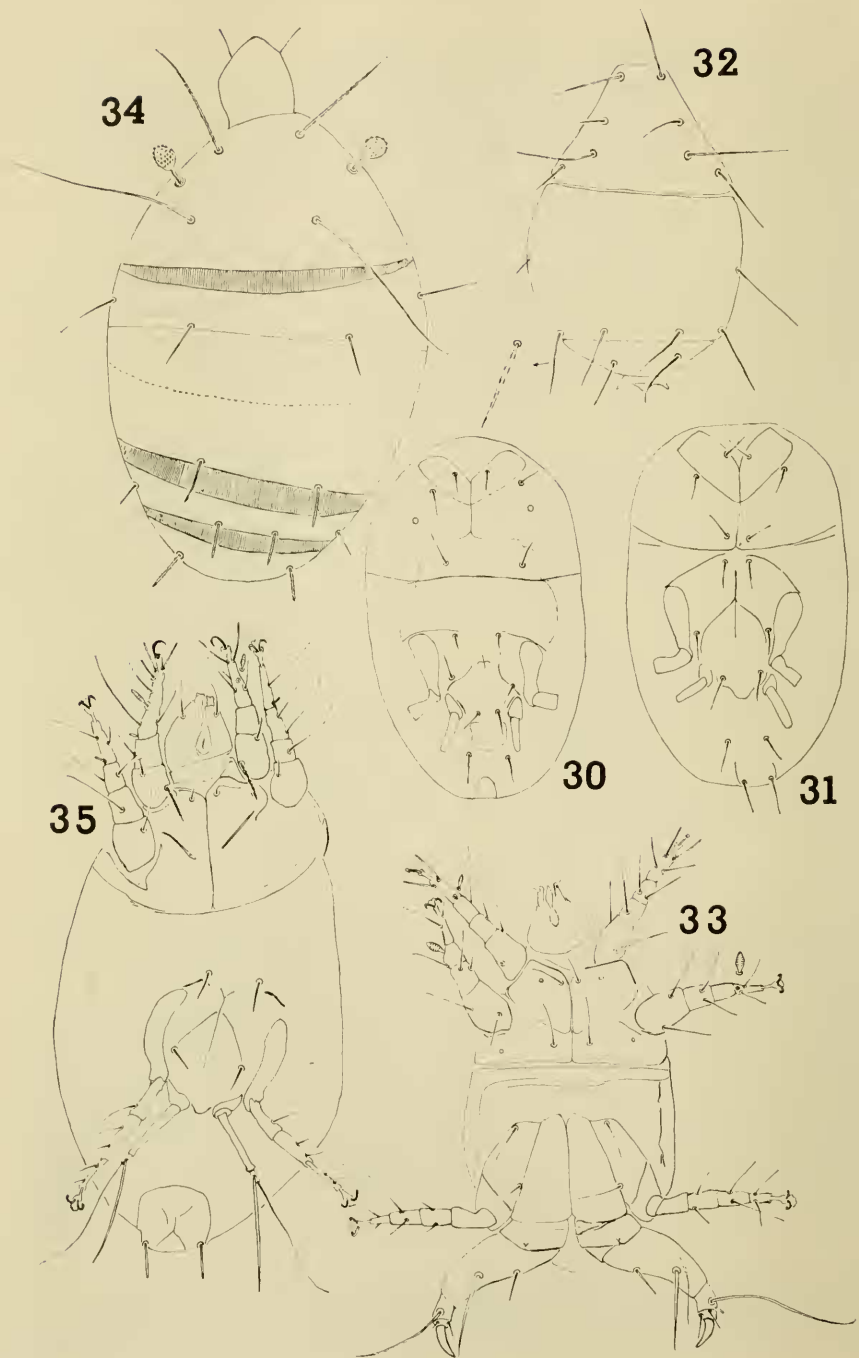
(Figs. 32-35)

This species may be recognized by the presence of an extremely large solenidion on tibia II and by a serrate seta on genu I and II ventrally.

Male. Body short, oval, broadest at metapodosoma. Dorsal body setae short, slender, as figured; third pair of propodosomals longest, one-third longer than first and fourth pairs; second pair shortest, about two-thirds length of third pair; fourth pair subequal in length to first pair. First three pairs of hysterosomals of equal length, about as long as first and fourth pairs of propodosomal setae. Opisthosoma with a single pair of simple setae, subequal to second pair of propodosomals. Ventral apodemes as figured, first pair shorter than second pair and not forming the Y-shaped juncture at the anterior median apodeme. Transverse apodeme slightly obscure and separating at the anterior median apodeme; setation as figured; first

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Tarsonemella beameri. Fig. 24, dorsum, female; fig. 25, tarsus and tibia II, female; fig. 26, distal segment of tarsus II (after Beer); fig. 27, venter, female; fig. 28, venter, male; fig. 29, dorsum, male.



ventral apodemal setae shorter than second pair; posterior median apodeme forming an M-shaped juncture with apodemes III and IV; setation adjacent to the two apodemes simple and subequal in length. Legs I and II subequal in length and size; legs III smaller than legs I and II; legs IV as figured; femur with short anterior inner seta and a longer, stronger distal, daggerlike seta; genu with whip-like seta and strong solenidium; tibia-tarsus short, with short, slightly curved claw. Body 159 μ long by 83 μ wide.

Female. Body broadly oval, broadest at midlength. Pseudostigmatic organs spherical, bearing small spurlike projections, pedicel as long as expanded distal portion. Propodosomal shield with two pairs of setae; anterior pair serrated, two-thirds length of second pair; second pair simple, long, and slender, one-tenth shorter than length of the entire propodosoma; with a pair of median simple setae, one-third length of first pair of propodosomals and subequal to lateral pair. Hysterosoma with four segments, first segment with a pair of dorsal simple setae, and a pair of lateral simple setae; second segment larger than first, with a pair of serrated setae; third segment with lateral simple setae, and with a pair of serrated setae subequal to those of second segment; fourth ventral segment with one pair serrated setae; apodeme I, short, converging with anterior median apodeme; apodeme II longer than I, and not converging with anterior median apodeme; a pair of small, simple setae adjacent and below apodeme I; apodeme II without setae, transverse apodeme U-shaped, apodemes III and IV with a pair of subequal simple setae; posterior median apodeme forming a Y-shape at nonconverging extremities of apodeme III; apodeme IV converging with posterior median apodeme. Ventral setation for legs and genital plate as figured. Body 217 μ long by 114 μ wide.

The male holotype, USNM 3169, and a female paratype were collected on *Ananas sativus* Schult., Cook Islands, December 20, 1963, by A. Bucheler, for whom the species is named.

Tarsonemus hunti, n. sp.

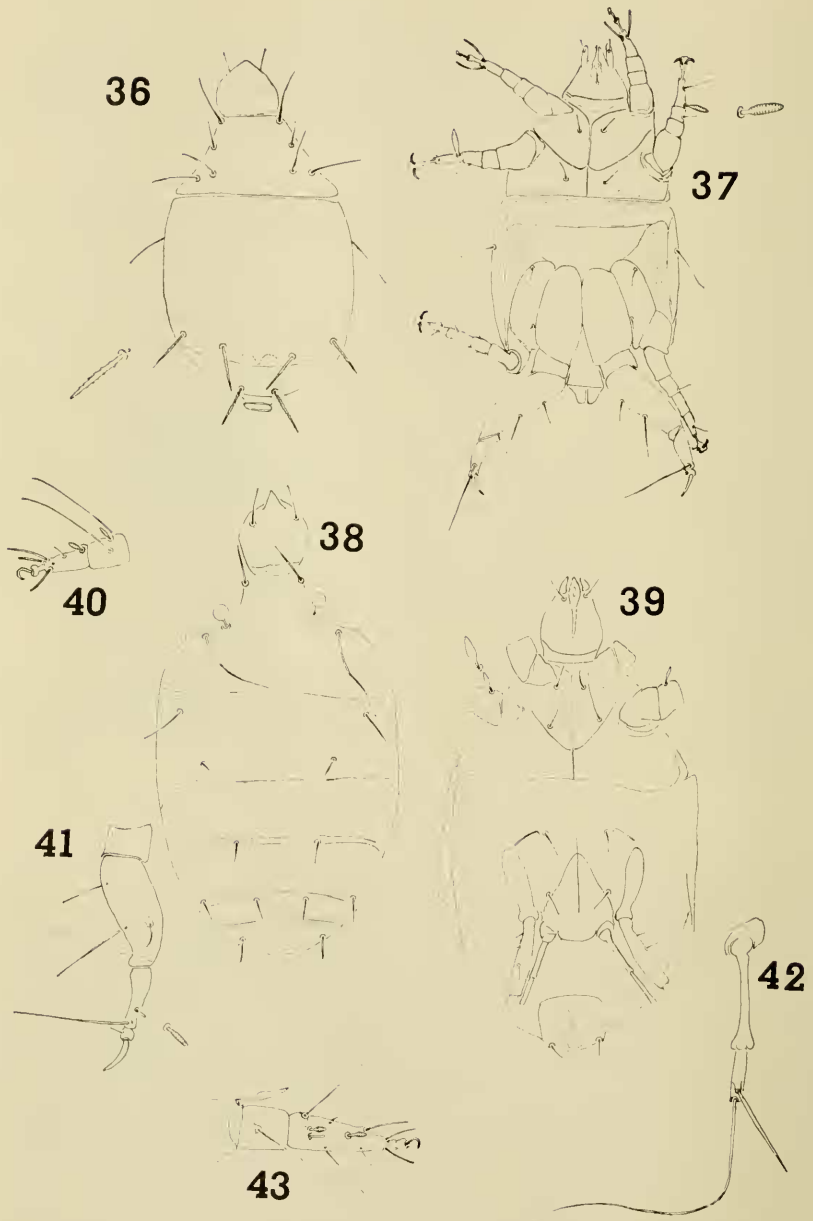
(Figs. 36-43)

This species may be recognized by the presence of the finely serrated hysterosomal setae and by a solenidium on tibia II which is almost as long as the segment.

Male. Body short, oval, broadest at metapodosoma. Propodosomal setae simple; first pair stronger and longer than others; second pair shortest; third pair slightly longer than second pair but not as long as fourth pair; fourth pair slightly shorter than first pair. Gnathosoma about as wide as long and as figured. Hysterosoma with three pairs of finely serrated setae, subequal in length; two pairs located transversely above suture; a single pair below suture; a pair of simple lateral setae present. Ventral propodosomal and hysterosomal setae subequal in length. Anterior median apodeme forming two distinct right angles with transverse apodeme;

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Neotarsonemus, new genus. Fig. 30, diagrammatic presentation of venter of female *N. latus*; fig. 31, diagrammatic presentation of venter of female *N. beeri*. *Tarsonemus bucheleri*, new species. Fig. 32, dorsum, male; fig. 33, venter, male; fig. 34, dorsum, female; fig. 35, venter, female.



sclerotization light above and below this apodeme. Venter of the hysterosoma as figured and with bowl-shaped plate above and adjacent to apodemes III and IV. Legs I and II similar in length. Leg II smaller in size and length to legs I and II. Leg IV as figured and terminating with a long slender curved claw. Body 127 μ long by 70 μ wide.

Female. Distinctive in having short, rodlike solenidion on tarsi I and II and a ball-shaped pseudostigmatic organ with spurlike projections. Body 165 μ long by 95 μ wide.

The male holotype, USNM 3170, and a female paratype were collected on *Hibiscus* sp., Tonga Islands, October 13, 1964, by P. C. Hunt, for whom the species is named.

***Tarsonemus stricketti*, n. sp.**

(Figs. 44-45)

This species may be recognized by the presence of the finely serrated hysterosomal setae and the ventral striation pattern.

Male. Body broad, oval, broadest at sejugal suture. Dorsal propodosomal setae simple, long and slender; third pair of propodosomals longest, one-half as long as the other three pair; first pair longer than second and fourth pair; second pair shortest; fourth pair about two-thirds the length of first pair. Hysterosoma with three pairs of finely serrated setae; the first two pairs subequal in length, lying transversely near the posterior margin; a shorter pair caudad. Venter of propodosoma as figured; apodemes I short, forming a Y-shaped juncture with anterior median apodeme; apodemes II long and strong, curving inward to anterior median apodeme; transverse apodeme strong, curving inward to anterior median apodeme to form apodemal plate II; apodemal plate I with lateral pore below coxal condyle, and with a simple seta; apodemal plate II without pore, but with a simple seta; striations for each plate as figured. Venter of hysterosoma as figured; with a pair of lateral plates each with a simple seta; apodemal plates III and IV with longitudinal striations; each plate with a pair of simple setae; seta on plate III longer than that on IV. Legs I and II subequal in length and size and with strong solenidion on each tarsus as figured; leg III smallest; leg IV with short, stout femur bearing a simple seta proximally and long slender saberlike seta distally; tibia IV with a dorsal strong solenidion and terminating with a short, strong tarsal claw. Body 172 μ long by 96 μ wide.

The male holotype, USNM 3173, was collected from water chestnut, Hong Kong, January 13, 1965, by J. H. Strickett, for whom the species is named.

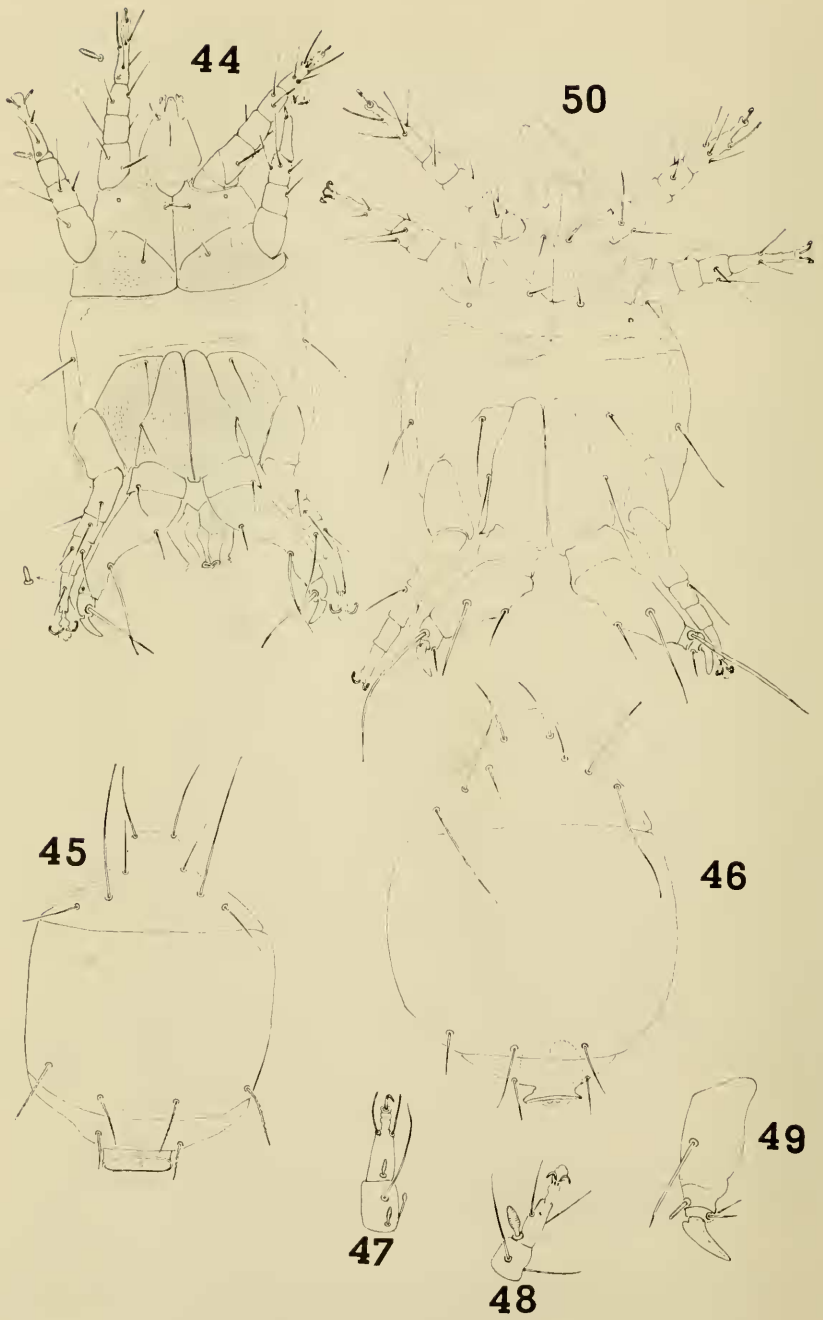
***Tarsonemus moseri*, n. sp.**

(Figs. 46-50)

This species is characterized by the short stubby femur of leg IV and by the length of the fourth pair of propodosomal setae.

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Tarsonemus hunti, new species. Fig. 36, dorsum, male; fig. 37, venter, male; fig. 38, dorsum, female; fig. 39, venter, female; fig. 40, tibia and tarsus I, male; fig. 41, leg IV, male; fig. 42, leg IV, female; fig. 43, leg I, female.



Male. Body oval, broadest in region of metapodosoma. Dorsal propodosomal setae simple, long and slender; fourth pair of propodosomals longest, one-half longer than second pair, and one-third longer than first and third pair; first and third pair subequal in length. Hysterosoma with three pairs of simple setae; first two pairs subequal in length, lying transversely near the posterior margin; a shorter pair caudad. Venter of propodosoma as figured; apodemes I short, forming a Y-shaped juncture with anterior median apodeme; apodeme II long and strong, curving inward to anterior median; anterior median not well defined below apodeme II, converging with transverse apodeme and forming distinct right angles and apodemal plate II; apodemal plate II large, with lateral pore medially to transverse apodeme and coxal condyle II. Venter of hysterosoma as figured; two lateral plates each with a simple seta; apodemal plate III with two simple setae, proximal seta one-third longer than distal seta; apodemal plate IV without setae. Legs I and II subequal in length and size; tarsus II with large solenidion twice the size of solenidion on tarsus I; leg III smallest; leg IV with short stubby femur, bearing a short simple seta proximally and long saberlike seta distally; tibia IV with a strong dorsal solenidion and a long whiplike seta, and terminating with short, strong tarsal claw. Body 134 μ long by 83 μ wide.

The male holotype, USNM 3172, and 7 male paratypes were collected from inner galleries of loblolly pine with *Dendroctonus frontalis* Zimmerman at Elizabeth, Louisiana, January 3, 1966, by John C. Moser, U. S. Forest Service, Southern Forest Experiment Station, U. S. Department of Agriculture, Pineville, Louisiana, for whom the species is named.

***Tarsonemus stegmaieri*, n. sp.**

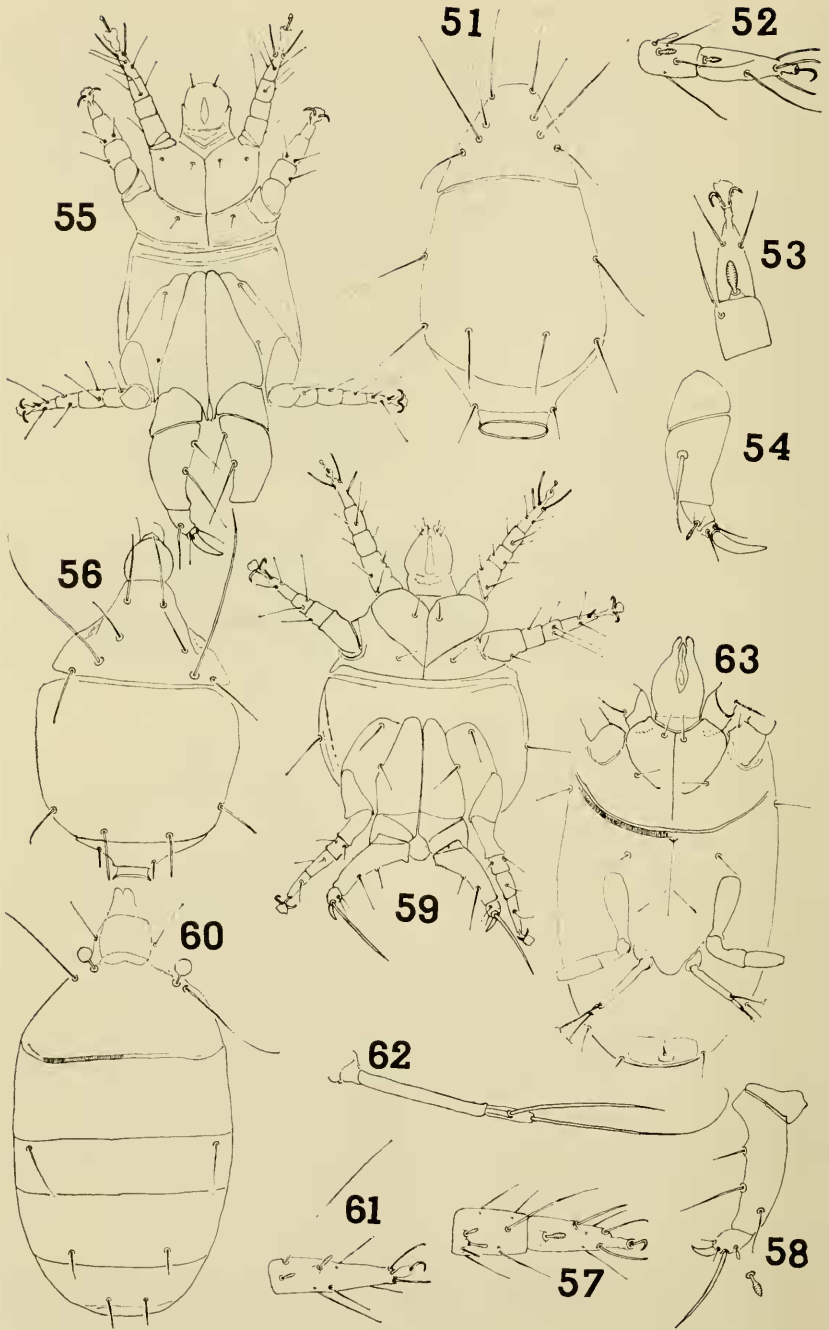
(Figs. 51-55)

This species may be recognized by the presence of the saberlike seta on femur IV and the ventral spur on tibia IV.

Male. Body oval, broadest in region of metapodosoma. Dorsal propodosomal setae simple, long, and slender; third pair of propodosomals longest, almost one-half longer than second and fourth pairs; first pair one-third shorter than third pair; second and fourth pairs subequal in length. Hysterosoma with three pairs of simple setae; first two pairs subequal in length and lying transversely near the posterior margin; a shorter pair caudad. Venter of propodosoma as figured; apodemes I short, forming a Y-shaped juncture with anterior median apodeme; apodeme II long and strong, curving inward to anterior median apodeme; anterior median apodeme stronger below apodemes II and converging with transverse apodeme to form apodemal plate II; apodemal plate II wider than long, whereas apodemal plate I is longer than wide; each plate with a simple seta; the setae on plate I shorter; plate I with lateral pore. Venter of hysterosoma as figured; apex of apodemes III and IV forming M-shaped juncture with posterior median apo-

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Tarsonemus stricketti, new species. Fig. 44, venter, male; fig. 45, dorsum, male. *Tarsonemus moseri*, new species. Fig. 46, dorsum, male; fig. 47, tarsus and tibia I, male; fig. 48, tarsus and tibia II, male; fig. 49, leg IV, male; fig. 50, venter, male.



deme; apodemal plate III with two simple setae, proximal seta one-half longer than distal seta; apodemal plate IV without setae. Legs I and II subequal in length; legs III smallest; tarsus III with a ventral spur; leg IV with short femur, bearing a short, simple seta and long daggerlike seta distally; tibia IV with strong dorsal solenidion and a short simple seta, and terminating with long, strong tarsal claw. Body 140 μ long by 70 μ wide.

Female. Not known.

The male holotype, USNM 3171, was collected from coconut in husk, Bahama Islands, August 31, 1964, by C. E. Stegmaier, for whom the species is named.

***Tarsonemus newkirki*, n. sp.**

(Figs. 56-63)

This species may be recognized by the third pair of propodosomal setae which are longer than legs I and II and by the heart-shaped figure formed by apodemes I and II, coxal condyles I, and the anterior median apodeme.

Male. Body oval, broadest at suture separating propodosoma and hysterosoma. Dorsal propodosomal setae simple, long, and slender; third pair of propodosomals longest, one-half longer than first pair; first pair strong, one-third longer than second pair; second pair shortest; fourth pair subequal to first, but not as strong. Hysterosoma with three pairs of simple setae; first two pairs subequal in length and lying transversely near posterior margin; a shorter pair caudad. Venter of propodosoma as figured; apodemes I short, curving to coxal condyles, and forming Y-shaped juncture with anterior median apodeme; apodemes II strong, converging with anterior median apodeme; when viewed as a whole, these structures give a heart-shaped figure; anterior median apodeme not well defined below center of apodemes II, converging with transverse apodeme; apodemal plates I and II with a pair of setae subequal in length. Venter of hysterosoma as figured; posterior median apodeme forming M-shaped juncture with apodemes III; apodemal plate III with two pairs of subequal simple setae; apodemal plate IV without setae. Legs I and II subequal in length and size; leg III smaller, but subequal in length to legs I and II; leg IV as figured; with long femur bearing an inner simple seta proximally, a daggerlike seta medially and a simple seta dorso-distally; tibia IV with a strong solenidion and a saberlike seta; tarsus IV terminating with a short, strong tarsal claw. Body 127 μ long by 76 μ wide.

Female. Distinctive in having a heart-shaped figure formed by apodemes I and II, coxal condyles I, and the anterior median apodeme. Body 127 μ long by 76 μ wide.

The male holotype, USNM 3174, and a female paratype were collected on semidecayed banana, Fiji Islands, September 22, 1963, New

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Tarsonemus stegmaieri, new species. Fig. 51, dorsum, male; fig. 52, tibia and tarsus I, male; fig. 53, tibia and tarsus II, male; fig. 54, leg IV, male; fig. 55, venter, male. *Tarsonemus newkirki*, new species. Fig. 56, dorsum, male; fig. 57, tarsus and tibia I, male; fig. 58, leg IV, male; fig. 59, venter, male; fig. 60, dorsum, female; fig. 61, tarsus I, female; fig. 62, leg IV, female; fig. 63, venter, female.

Zealand Department of Agriculture, Plant Quarantine No. A320. The species is named for Richard A. Newkirk, Survey and Detection, ARS, Plant Pest Control Division, U. S. Department of Agriculture.

REFERENCES

- Beer, R. E.** 1954. A revision of the Tarsonemidae of the Western Hemisphere (Order Acarina). Univ. Kansas Sci. Bull. 36 Pt. 2, No. 16: 1091-1387.
- . 1958. The Genus *Tarsonemella* Hirst, with description of a new species (Acarina, Tarsonemidae). Jour. Kan. Ent. Soc. 31 (2): 188-192.
- Cromroy, H. L.** 1958. A preliminary survey of the plant mites of Puerto Rico. Jour. Agr., Univ. Puerto Rico 42 (2): 39-144.
- Ewing, H. E.** 1939. A revision of the mites of the subfamily Tarsoneminae of North America, the West Indies, and the Hawaiian Islands. U. S. Dept. Agr. Tech. Bull. 653, 1-63.
- Smiley, R. L.** 1964. Some Tarsonemidae from the Republic of the Congo. Proc. Ent. Soc. Wash. 66 (3): 145-150.

NEW HOST RECORDS FOR NORTH AMERICAN FRUIT FLIES
(DIPTERA: TEPHRITIDAE)

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Although host plants have been reported for about 70% of the approximately 240 species of Tephritidae known to occur in America north of Mexico, many of the published records are not based on actual rearings or are too fragmentary to be of much value. A few workers assumed that the larvae of a particular tephritid fed on a plant merely because adults were seen on the foliage. Another source of confusion has resulted from the changing taxonomic status of certain tephritid groups. For example, some previously well-known species have been shown subsequently to be really species groups (see Bush, 1966, on *Rhagoletis*). It is frequently difficult, if not impossible, to determine at a later date which species of the complex was actually reared from a particular host.

This paper is based on rearings conducted in southern Idaho and northwestern Montana during the summers of 1965 and 1966 and in northeastern Ohio between 1961 and 1966. It is presented now so that the records can be included in a comprehensive list of host plants of

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